

REMARKS

The Amendments

Claim 1 has been amended to more particularly point out and distinctly claim the subject matter Applicant regards as the invention. This amendment is supported throughout the specification, which describes the wrapper as “normal combustible cigarette paper,” “combustible wrapper,” “conventional cigarette paper or similar combustible product.” As noted at the last full paragraph of page 19, “the cigarette paper demonstrates conventional ashing characteristics.” Applicant respectfully submits that this amendment adds no new matter to the application and earnestly solicits entry thereof.

The Invention

The claims are directed to a cigarette having a tobacco rod and a wrapper for the rod, wherein the wrapper is combustible, burns, and ashes, and comprises porous particulate cerium oxide. Claims also are directed to a cigarette comprising a tobacco rod and a cigarette paper that is combustible, burns, and ashes. The paper comprises a rare earth metal oxide and an essentially non-combustible, finely divided porous particulate adjunct for the rare earth metal oxide. In particular, claims are directed to a cigarette comprising a tobacco rod and a cigarette paper that is combustible, burns, and ashes, and which paper has a sidestream smoke treatment composition comprising, in combination, a rare earth metal oxide and an essentially non-combustible finely divided porous particulate adjunct for the rare earth metal oxide.

Claim 45 is directed to a low sidestream smoke cigarette comprising a tobacco rod and a treatment paper that is combustible, burns and ashes. The treatment paper has a sidestream smoke treatment comprising an oxygen storage and donor metal oxide oxidation catalyst precursor and an essentially non-combustible finely divided porous particulate adjunct for the

catalyst. The oxygen storage and donor metal oxide oxidation catalyst release oxygen at free burn temperatures for the cigarette.

Claim 46 is directed to a combustible cigarette paper for use on a smokable tobacco rod of a cigarette. The combustible cigarette paper is for reducing the sidestream smoke emitted from a burning cigarette. The paper is combustible, burns, and ashes, and has a sidestream smoke treatment comprising an oxygen storage and donor metal oxide oxidation catalyst precursor and an essentially non-combustible finely divided porous particulate adjunct. The oxygen storage and donor metal oxide oxidation catalyst release oxygen at free burn temperatures of a cigarette made from the paper.

The Office Action

Claims 2 and 3 are not rejected on the merits.

Claim 1 stands rejected under 35 U.S.C. § 102(b) as anticipated by Snaidr, WO 98/16125, particularly over claim 29 thereof.

Claims 1, 4-7, 12-14, 17-18, 20-21, and 45-46 stand rejected under 35 U.S.C. § 102(e) as anticipated by Bowen, US 6,286,516, or under 35 U.S.C. § 102(a) as anticipated by Bowen, WO 99/53778. Cerium oxide is said to be applied to zeolite substrate. In particular, according to the Office Action, the oxygen storage component of Bowen releases oxygen at 300°C, whereas the free burn temperature of those cigarettes is between about 400 and 900°C.

Claims 8 and 19 stand rejected under 35 U.S.C. § 103(a) as obvious over Bowen WO '778 in view of Schlatter, US 5,040,551. According to the Office Action, these documents indicate that, at the time the invention was made, it would have been obvious to have used iron oxide as catalyst.

Claim 9 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Bowen '778. The Office Action admits that the loading rate of cerium oxide is not disclosed, but asserts that the

amount, and optimization of the amount, would have been obvious to preclude depletion of the number of puffs in the cigarette by controlling the amount of oxygen release.

Claims 10-11, 15-16, and 22-23 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Bowen '778 in view of Grodek, US 5,004,711. Bowen is said to teach sorbatives, such as a zeolite, and teaches that zirconium oxide is a sorbative. The Office Action asserts that, at the time the invention was made, it would have been obvious to substitute known sorbents.

Claims 1, 12, 20 and 45-46 stand rejected on the ground of non-statutory obviousness-type double patenting over claims 5 and 13 of United States Patent Number 6,286,516. Although the claims are not identical, the Office Action asserts that it would have been obvious that to put cerium oxide on the porous adjunct meets the claim limitation requiring a porous cerium oxide, and to have expected the catalyst to release oxygen at free burn temperatures of the cigarette.

The Cited Documents

WO 98/16125 is directed to a non-combustible apparatus used in combination with a tobacco product to control sidestream smoke and to increase the number of puffs available to the smoker from a given amount of tobacco. The non-combustible apparatus comprises a tube having a predetermined porosity into which tobacco product is placed. The porosity of the tube is selected to provide sidestream smoke reduction and to reduce the free-burn rate between puffs. Claim 29 is directed to this apparatus having a ceramic oxide comprising cerium oxide. Importantly, the device of WO 98/16125 is re-usable because it is not combustible and does not burn or ash.

Bowen, United States Patent Number 6,286,516, is directed to a porous, non-combustible material for treating sidestream smoke. This material is used to surround a conventional cigarette. In particular, Bowen is directed to a cigarette that has a non-combustible wrapper that surrounds and is in substantial contact with conventional cigarette paper portion of a cigarette.

The material has a high porosity which encourages conventional free-burn rate for a cigarette. The oxygen storage component releases oxygen at free-burn rate temperatures adjacent a burning coal to both:

- a) compensate for the material reducing rate of oxygen diffusion to a burning coal to ensure conventional free-burn rate; and
- b) contribute to the oxidation treatment of components of sidestream smoke.

The cigarette is designed to have a sufficiently high porosity, usually in excess of 200 Coresta units, which encourages a conventional free-burn rate of the conventional cigarette. In other words, the wrapper is transparent to the cigarette so the cigarette burns at its normal rate to give the usual flavor and taste of a conventional cigarette. The presence of the oxygen donor material is to release sufficient oxygen to compensate for any reduction in oxygen diffusion to the burning coal caused by the non-combustible material. Thus, the material ensures the conventional free-burn rate and contributes to the oxidation treatment of components of sidestream smoke.

Schlatter, United States Patent Number 5,040,551, discloses a method for reducing the amount of carbon monoxide produced in combustion of carbonaceous materials. The materials are coated with a non-combustible particulate matter. The particulate matter is microporous and is a high-melting oxide. The thickness of the coating is closely controlled to ensure proper carbon monoxide reduction. Catalysts also can be added. Tobacco may surround the carbonaceous materials.

Grodck, United States Patent Number 5,004,711 is direction to preparation of colloidal zirconium oxide sols. Ceria, calcia, magnesia, and other oxides can be used as stabilizer for zirconia powders obtained.

The Invention in view of the Cited Documents

Rejections under 35 U.S.C. § 102

Claim 1 stands rejected under 35 U.S.C. § 102(b) as anticipated by International Patent Application No. WO 98/16125 to Snaird *et al.* (equivalent to U.S. Patent No. 6,371,127). In particular, the Office Action asserts that Claim 29 discloses a porous tubular element comprising cerium oxide and encasing a tobacco charge, which is deemed to be a tobacco rod and to disclose the claimed invention.

Applicant respectfully traverses this rejection. The cited document is directed to a *non-combustible* porous apparatus in the form of a tubular element, and neither suggests nor discloses a wrapper that is combustible, burns, and ashes and comprises porous particulate cerium oxide as is required by the claims. The cited document teaches only a non-combustible tubular element, and does not disclose or suggest the cigarette of claim 1.

International Patent Application No. WO 98/16125 to Snaird *et al.* (equivalent to U.S. Patent No. 6,371,127) is directed to a device that is effectively a cigarette holder that provides sidestream smoke control and free-burn rate control. The exterior tubular element (12) of the device of International Patent Application No. WO 98/16125 contains a cigarette or tobacco charge within its interior and is non-combustible, so it is not consumed when the cigarette is smoked. As described at page 11, lines 11 to 24, the tubular element is reusable. The specification at page 15, lines 15 to 18, teaches that the tubular element is made from non-combustible materials such as ceramics, plastics, treated papers and wood-derived materials.

A catalyst may be incorporated within the material used to form the tubular element (12), on the inner or outer surfaces of the tubular element or in the material used to form the porous elements (18). See at least page 1, lines 23 to 24; page 6, lines 7 to 13; page 7, line 33 to page 8,

line 3; which describe the tubular element (12) and inclusion of a catalyst and at least page 12, lines 15 to 17, which describes the presence of the catalyst in the porous elements (18).

At page 15, line 18, the cited document reiterates that the interior of the tube may be coated with catalytic particles to catalyze oxidation of combustion products. Suitable catalysts are described in detail from page 27, line 29 through to page 33, line 7.

Thus, Applicant respectfully submits that International Patent Application No. WO 98/16125 discloses a *physical* means of controlling sidestream smoke through use of a device that retards airflow (thus controlling free-burn rate) and which optionally has the ability to absorb combustion products and so may be coated with a catalyst to aid oxidation of combustion products. The inclusion of a catalyst is not essential for the device of International Patent Application No. WO 98/16125 to achieve effective sidestream smoke control – note that the presence of a catalyst in the cited document is described as an optional feature in the specification.

Unlike the non-combustible tubular element (12) of International Patent Application No. WO 98/16125, the paper of claim 1 is combustible, and it burns and ashes, as recited in the pending claim. The tubular element (12) of International Patent Application No. WO 98/16125 is a non-combustible apparatus or device, not a wrapper of the claimed invention. Rather than physically retarding airflow with a non-combustible device to reduce sidestream smoke, the present invention achieves sidestream smoke control through the porous and catalytic nature of the porous particulate cerium oxide of the combustible wrapper, not through physical means as in the cited document.

Therefore, Applicant respectfully traverses this rejection and earnestly solicits allowance of the pending claims.

Claims 1, 4-7, 12-14, 17-18, 20-21 and 45-46 stand rejected under 35 U.S.C. § 102(c) as anticipated by U.S. Patent No. 6,286,516 to Bowen *et al.* (equivalent to International Patent Application No. WO 99/53778).

Applicant respectfully submits that the cited reference does not disclose or suggest a *non-combustible* wrapper comprising *porous particulate* cerium oxide of independent claims 1, 12, 20, 45 and 46.

International Patent Application No. WO 99/53778 is directed to a cigarette that has a *non-combustible* material which surrounds and is in substantial contact with conventional cigarette paper portion of a cigarette. The *non-combustible* material has a high porosity which encourages conventional free-burn rate for the conventional cigarette it surrounds. The *non-combustible* material includes an oxygen storage component that releases oxygen at free-burn rate temperatures adjacent a burning coal to:

- a) compensate for the material reducing rate of oxygen fusion to a burning coal to ensure conventional free-burn rate; and
- b) contribute to the oxidation treatment of components of sidestream smoke.

The presence of the oxygen donor material is to release sufficient oxygen to compensate for the treatment material reducing rate of oxygen diffusion to the burning coal to ensure the conventional free-burn rate and as well, contribute to the oxidation treatment of components of sidestream smoke.

Bowen does not teach or suggest a combustible wrapper (a structural feature) comprising *porous particulate* cerium oxide of these claims. The material of Bowen is *non-combustible*, as claimed in Bowen. The non-combustible material of Bowen comprises oxygen donor material. In contrast, Applicant's claimed wrapper is *combustible* and it comprises the oxygen donor

material. Bowen never suggests adding the oxygen donor material to the paper of the conventional cigarette.

With respect to these pending independent claims 1, 12, 20, 45 and 46, the use of the combustible cigarette paper or treatment paper of the claimed invention produces a cigarette paper with very little sidestream smoke on burning because of the novel combination of an oxygen storage and donor metal oxide oxidation catalyst and an essentially non-combustible finely divided porous particulate adjunct for the catalyst or, more specifically claimed in Claims 12 and 20, a rare earth metal oxide oxidation catalyst and an essentially non-combustible finely divided porous particulate adjunct for the catalyst. The oxygen storage and donor metal oxide oxidation catalyst and the non-combustible finely divided porous particulate adjunct are used in combination to achieve sidestream smoke reduction. As taught at pages 17 and 18 of the specification, 'in combination' means that the materials are used together, for example, either by co-mingling, coating the catalyst on the adjunct, impregnating the catalyst within or on the porous surface adjunct or in layers. Quite surprisingly, this combined use of the metal oxide with the adjunct provides sidestream smoke control. It was quite unexpected that these two constituents used together in combination provide sidestream smoke control by simply being part of a combustible cigarette paper. Other than constituents used to provide this combination in sheet form, there is no other requirement for other components to control sidestream smoke.

The cigarette of the cited document is designed to burn at conventional free-burn rates and to rely on the oxygen storage component to release oxygen to support that free-burn rate. This cited document does not contemplate that sidestream smoke control can be realized by combined use of an oxygen storage and donor metal oxide (e.g. rare earth metal oxide) in combination with porous adjunct to reduce sidestream smoke, as set forth in the pending claims. This use in combination is not realized in the cited document.

The office action asserts that Bowen teaches that the non-combustible treatment material can include two components: a porous non-combustible material (see Col. 4, lines 1ff) which can be zeolite (see Col. 7, lines 5ff and Col. 8, lines 45ff) and an oxygen storage component, whereby the cerium oxide is in situ or applied to the surface of the zeolite (Col. 7, lines 33ff). The non-combustible treatment material surrounds the cigarette paper of a conventional cigarette and typically is a tube. The tube does not comprise an oxygen storage and donor metal oxide oxidation catalyst and an essentially non-combustible finely divided porous particulate adjunct for the catalyst. Moreover, the tube is non-combustible, whereas the wrapper/paper/treatment material of the claimed invention is combustible.

For at least these reasons, Applicant respectfully submits that the cited document does not teach or suggest the claimed invention.

Rejections under 35 U.S.C. § 103

Claims 8 and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bowen in view of U.S. Patent No. 5,040,551 to Schlatter. Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Bowen.

Applicant respectfully traverses these rejections. As set forth above, Bowen fails as a primary reference, and Schlatter adds nothing relevant to the disclosure of Bowen. Schlatter discloses that carbon monoxide levels of coated carbonaceous materials can be reduced by adding metals or their oxides to the coating of the fuel material. This discloses nothing relevant to the rejected claims, and Applicant respectfully traverses this rejection of claims 8 and 19.

Applicant respectfully submits that Bowen does not render claim 9 obvious. As set forth above, Bowen is directed to a non-combustible device. Further, as the Office Action admits, Bowen does not suggest or disclose a loading rate. Thus, it is only with the information provided in the pending application that one can suggest a loading rate. This is true because the skilled

practitioner can calculate a loading based only on the use disclosed in the pending application. Thus, Applicant respectfully submits that it is only by impermissible hindsight reconstruction that the skilled practitioner can make this calculation. Applicant respectfully traverses this rejection.

The Examiner has also rejected Claims 10-11, 15-16 and 22-23 under 35 U.S.C. § 103(a) as being unpatentable over Bowen in view of U.S. Patent No. 5,004,711 to Grodek. Applicant respectfully traverses this rejection. Bowen is directed to a non-combustible device, and Grodek is directed to stabilization of zirconia powders made from zirconia sols. Ceria, magnesia, and other oxides can serve as stabilizer. Applicant respectfully submits that the disclosure of Grodek adds nothing relevant to the disclosure of Bowen, and Applicant respectfully traverses this rejection.

For the reasons discussed above with respect to Bowen, none of these references, even if appropriately combinable with Bowen, cures the deficiencies of this combination or teaches or suggests the subject matter of these claims.

Rejections based on Obviousness-type Double Patenting

Claims 1, 12, 20, 45, and 46 stand rejected on the ground of obviousness-type double patenting over claims 5 and 13 of Bowen, U.S. Patent No. 6,286,516. Applicant respectfully traverses this rejection.

Bowen '516 does not teach or suggest a combustible wrapper (a structural feature) comprising *porous particulate* cerium oxide of these claims. The material of Bowen '516 is *non-combustible*, as claimed in Bowen '516. The *non-combustible* material of Bowen '516 comprises oxygen donor material. In contrast, Applicant's claimed wrapper is *combustible* and it comprises the oxygen donor material. Bowen '516 never suggests adding the oxygen donor material to the paper of the conventional cigarette.

Simply put, Bowen '516 discloses a different invention. Again, the apparatus of Bowen '516 is non-combustible. As set forth above, there are significant differences between what Bowen discloses or fairly suggests and the pending claims. Applicant respectfully traverses this rejection.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance for at least the reasons set forth above. Applicant respectfully traverses the pending rejections and earnestly solicits favorable action thereon.

Respectfully submitted,

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